

I claim

1. A counterflow heat exchanger comprising one or more cold air intake passageways and one or more hot air intake passageways wherein the flow of cold air is opposite the flow of hot air and wherein each cold air intake passageway contacts at least one hot air intake passage way.

2. The heat exchanger according to claim 1 wherein each hot air intake passageway has an upper surface and a lower surface and at least one hot air intake passageway has a cold air intake passageway in contact with each of said upper and lower surfaces.

3. The heat exchanger according to claim 2 wherein each hot air intake passageway has a pair of opposing sidewalls connecting said upper and lower surfaces.

4. The heat exchanger according to claim 3 wherein each of said upper and lower surfaces have a surface area greater than the surface area of each of said sidewalls.

5. The heat exchanger according to claim 5 wherein each of said hot air passageway exhausts the air exiting said passageway perpendicular to the flow of cold air in the cold air intake passageways.

6. The heat exchanger according to claim 2 wherein said passageways are formed from a corrugated fin.

7. The heat exchanger according to claim 6 wherein the corrugated fin forming said passageways forms three sides of said passageways.

8. The heat exchanger according to claim 7 wherein said passageways have a fourth side formed from a heat exchanger sidewall.

9. The heat exchanger according to claim 2 further comprising a split manifold.

10. The heat exchanger according to claim 9 wherein the split manifold comprises a plurality of entranceways and exits, each said entranceways having an intake passage extending therefrom and each of said exits having an outflow passage extending therefrom, said intake passage splitting into two or more intake sections and each of said outflow passages splitting into two or more outflow sections.

11. The heat exchanger according to claim 10 wherein one or more outflow sections have a top surface and a bottom surface and there is a intake section on each of said surfaces and wherein one or more intake sections have a top surface and a bottom surface and there is a outflow section on each of said surfaces.

12. The heat exchanger according to claim 1 wherein the aspect ratio of the height to the width is at least 10:1 invention has a high aspect ratio for the corrugated fin compared to the prior art.

13. The heat exchanger according to claim 1 wherein the conduction losses associated with a long effective fin in a multi-stage design are eliminated.

14. The heat exchanger according to claim 1 wherein fin efficiency approaches unity.

15. The heat exchanger according to claim 1 wherein fin efficiency approaches 100%.

16. The heat exchanger according to claim 14 wherein the conductive heat transfer losses are eliminated.

17. The heat exchanger according to claim 15 wherein the conductive heat transfer losses are eliminated.